CLAIMS

What is claimed is:

1. A method for fabricating a MR sensor comprising:

a) depositing a bottom resist layer on a substrate, the bottom resist layer comprising a first polymer;

b) depositing a top resist layer on the bottom resist layer, the top resist layer comprising a second polymer;

c) exposing the top resist layer to energetic particles in a bridge pattern defining a trackwidth of the MR sensor;

d) developing the exposed top resist layer with a second developer; and

e) etching the bottom resist layer in a first developer to form a fully undercut resist bridge structure suspended above the substrate, wherein the resist bridge has a width narrower than 0.2 micron.

2. The method of claim 1, wherein the energetic particles are selected from the group consisting of electrons and photons.

3. The method of claim 1, wherein a thickness of the bottom polymer layer and a resulting undercut gap between the resist bridge and the substrate are sufficient to prevent capillary action from collapsing the resist bridge.

4. The method of claim 3, wherein the thickness of the bottom polymer layer is between 0.02 micron and 0.1 micron.

5. The method of claim 1, wherein the first polymer comprises polymethyl glutarimide.

6. The method of claim 5, wherein the first developer comprises a basic solution selected from the group consisting of NaOH and KOH.

7. The method of claim 1, wherein the second polymer comprises an e-beam sensitive resist.

8. The method of claim 7, wherein the second polymer comprises polymethyl methacrylate.

9. The method of claim 8, wherein the second developer comprises isopropyl alcohol and water.

10. The method of claim 1, wherein the second polymer comprises a deep ultraviolet resist.

11. The method of claim 10, wherein the first and second developers are identical.

12. The method of claim 10, wherein the second developer comprises a basic solution selected from the group consisting of NaOH and KOH.

13. The method of claim 1, wherein the substrate is a magnetoresistive layer structure.

14. The method of claim 13 further comprising ion beam milling the magnetoresistive layer structure to form the magnetoresistive sensor.

15. The method of claim 14, wherein the top polymer layer has at least a minimum thickness to survive the ion beam milling.

16. The method of claim 15, wherein the thickness of the top polymer layer is between 0.2 micron and 0.5 micron.

17. The method of claim 1, further comprising depositing hard bias layers adjacent to the magnetoresistive sensor.

18. The method of claim 17, further comprising depositing insulating layers between the magnetoresistive sensor and the hard bias layer.

19. The method of claim 17, further comprising depositing leads over the hard bias layers for transmitting electrical signals.

20. The method of claim 19, further comprising depositing insulating layers between the hard bias layers and the leads.

21. The method of claim 14, wherein the magnetoresistive sensor has a trackwidth narrower than 0.2 microns.

22. The method of claim 14, wherein the magnetoresistive sensor has a trackwidth to thickness ratio of less than or equal to 4 to 1.

23. The method of claim 14, wherein the magnetoresistive sensor is incorporated in a magnetoresistive read head.

24. The method of claim 23, wherein the magnetoresistive read head is incorporated in a disk drive system.

25. A magnetoresistive sensor having a trackwidth narrower than 0.2 micron and a trackwidth to thickness ratio less than or equal to 4 to 1.

26. A magnetoresistive read head comprising:

a) a magnetoresistive sensor having a trackwidth narrower than 0.2 micron and a trackwidth to thickness ratio less than or equal to 4 to 1;

b) first and second shields sandwiching the magnetoresistive sensor; and

c) first and second gaps disposed between the magnetoresistive sensor and the first and second shields.

27. A disk drive system comprising:

a) a magnetic recording disk;

b) a magnetoresistive read head containing a magnetoresistive sensor;

c) an actuator for moving the magnetoresisitve read head across the magnetic recording disk; and

d) a motor for spinning the magnetic recording disk relative to the magnetoresistive read head;

wherein the magnetoresistive sensor having a trackwidth narrower than 0.2 micron and a trackwidth to thickness ratio less than or equal to 4 to 1.